Statistic Analysis on Offensive and Defensive Indexes of Different Position Players Participating in London Olympic Men's Basketball Games

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Abstract - By using methods of literature review, video observation and mathematical statistics the paper made a statistical research on defensive and offensive indexes of different position players of each team in London Olympic Men's Basketball Games, and through comparison with rivals and top eight found out progress and deficiency of Chinese Men's Basketball Team.

Index Terms – London Olympic Games. Basketball. Position. Offense and defense Ability

1. Introduction

From the Berlin Olympics in 1936 to the Beijing Olympics in 2008, Chinese men's basketball team has participated in the Olympic Games 10 times, three times in the top eight, but routed in London Olympics. Facing new Olympic cycle and Europe and America basketball players of each position in balanced development, the advantages and disadvantages of each position players must be carefully analysed. This study aimed to carry on a comprehensive analysis on offensive and defensive technical indicators and performance of the players in different position participating in London Olympic Men's Basketball Games and explore the gap of the Chinese men's basketball players of different position with the world's elite teams and provide the reference to talent selection and echelon construction in the future.

2. Study Subjects and Methods

A. Study Subjets

Taking 144 athletes participating in London Olympic Basketball Games as objects, including 57 guards, 61 forwards, 26 centers, analysing comprehensively offensive and defensive statistical indexes and performance in 38 games.

B. Study Methods

looked up literature of the Olympic Basketball Games to grasp reserch trends; Visited London Olympics and FIBA official website to collect 38 games technical statistics and classified according to different position. Dealt with related data using Spss20.0 and adopted comparative analysis on the results combining with 12 teams game video.

3. Result and Analysis

A. The overall evaluation on players offensive and defensive ability of the different position of 12 teams

1) Appropriate test on the variables when carrying out Factor Analysis: In order to reflect the comprehensive level of 144 players, selecting 2PA(X_1), 2PP(X_2), 3PA(X_3), 3PP(X_4), FTA(X_5), FTP(X_6), PTS(X_7), AS(X_8), TO(X_9), ST(X_{10}), OR(X_{11}), DR(X_{12}), BS(X_{13}), PF(X_{14}) as variables; after testing value of Kaiser-Meyer-Olkin and Barlett is 0.748 and 1143.941(Sig = 0.000), which show that chosen samples are suitable for factor anylysis.

2) Computing eigenvalue contribution and factor loading: Extracting four fators whose cumulative variance contribution rate is up to 69.039% and Loading plots change that 4th factor is slow both show that selecting four factors is suitable. After largest orthogonal rotation change confiming that Factor 1 (F_1) contains DR, 2PA, OR, BS, FTA, PTS, PF, Factor 2 (F_2) contains AS, TO, ST, Factor 3 (F_3) contains 3PA, 3PP, Factor 4 (F_4) contains 2PP, FTP.

3) Acquiring common facor score coefficient matrix: After calculation, fator score linear combination expression are: $F_1=0.203X_1-0.109X_2-0.057X_3+0.063X_4+0.192X_5-0.102X_6+0.244X_7+0.234X_8-0.166X_9+0.054X_{10}-0.021X_{11}-0.039X_{12}+0.326X_{13}+0.134X_{14,}$ $F_2=0.030X_1-0.092X_2+0.103X_3-0.197X_4-0.192X_5-0.082X_6-0.010X_7-0.041X_8+0.449X_9+0.043X_{10}+0.377X_{11}+0.405X_{12}-0.180X_{13}-0.024X_{14,}$ $F_3=0.013X_1-0.150X_2+0.344X_3+0.618X_4+0.084X_5+0.124X_6-0.194X_7+0.064X_8+0.064X_9-0.097X_{10}-0.102X_{11}-0.191X_{12}+0.052X_{13}+0.238X_{14,}$ $F_4=-0.032X_1+0.628X_2+0.030X_3-0.112X_4-0.068X_5+0.560X_6-0.106X_7-0.042X_8-0.015X_9+0.214X_{10}-0.131X_{11}-0.116X_{12}-0.220X_{13}++0.107X_{14}$

4) establishing evaluation model of players comprehensive ability: $F_{com}=(3.857F_1+2.582F_2+1.703F_3+1.523F_4)/(3.857+2.582+1.703+1.523)=0.399F_1+0.267F_2+0.176F_3+0.157F_4=0.086X_1+0.005X_2+0.070X_3+0.064X_4+0.085X_5+0.048X_6+0.044X_7+0.087X_8+0.034X_9+0.046X_{10}+0.054X_{11}+0.041X_{12}+0.071X_{13}+0.106X_{14}.$ According to F_{com} finally obtain comprehensive values of different position players. In top 8 teams there are at least four players whose values are above 0.10, especially USA with 6 players above 0.20 which fully reflects that the overall offense and defense has become the development trend of world basketball. However, in Chinese men's basketball team value of forword Yi jianlian is 1.43 in top, others are low.

B. The Clustering anylasis on players offensive and defensive ability of different position of 12 teams

Selecting 2PP, 3PP, FTP, OR, DR, AS, TO, ST, BS and PF as variables to carry out hierarchical clustering.

1) Forwards clustering: After clusting category 1 only contains USA, category 2 includes Russia, Austrilia, France, Spain, Lithuania, Agentina, Britain and Nigeria, category 3 includes Brazil and Tunisia, category 4 only includes China.

2) Guards clustering: After clusting category 1 only contains USA, category 2 includes Spain, Austrilia, France, Russia, Agentina and Tunisia, category 3 includes Nigeria and Britain, category 4 also only includes China.

3) Centres clustering: After clusting category 1 contains USA, Russia, France, Lithuania, China, Britain, Nigeria and Tunisia, category 2 only includes Spain, category 3 also includes Agentia, category 4 includes Austrilia and Brazil.

C. The analysis on influencing factors of different position players score

Scoring can also reflect the comprehensive strength of the players. Taking score as the dependent variable and Time, 2PP, 3PP, FTP, OR, DR, AS, TO, ST, BS and PF as independent variables, adding Start as virtual variable, carry out stepwise regression analysis. After goodness of fit of regression equation and coefficient test, final equations are:

$$\text{Forword Scores} = -1.806 + 0.142 \times \text{Time} + 8.052 \times \text{3PP} + 5.599 \times \text{2PP} + 3.841 \times \text{FTP} + 2.250 \times \text{Start} + 0.597 \times \text{OR} + 0.832 \times \text{BS}. \tag{1}$$

$$\text{CentersScores} = -1.416 + 0.343 \times \text{Time} + 4.055 \times \text{2PP} + 3.265 \times \text{FTP} - 1.282 \times \text{Start} + 3.579 \times \text{3PP}. \tag{2}$$

$$\text{Guards Scores} = -1.496 + 0.297 \times \text{Time} + 7.066 \times \text{3PP} + 4.597 \times \text{FTP} + 3.396 \times \text{2PP} - 0.506 \times \text{AS} + 1.034 \times \text{OR} - 0.385 \times \text{Foul}. \tag{3}$$

D. Differences between Chinese and foreign men's basketball players offense and defense ability of each position

1) Forwords discrepancy: The gap of Chinese men's basketball team with rivals and top 8 are 2PP, 3PA (P<0.05), 3PP, AS (P<0.01), unbalanced scoring, etc.

2) Centers discrepancy: The gap of Chinese men's basketball team with rivals and top 8 are scoring ability, 2PA, FTA, FTP (P<0.05), OR, etc.

3) Guards discrepancy: The gap of Chinese men's basketball team with rivals and top 8 are unsteady shooting, 2PP, 3PA, FTP, OR (P<0.01) , AS, etc.

TABLE I China, Rivals and Top 8 Forward, Center and Guard Average per Game Data List

Indexes		Forward				Center				Guard			
		China /Rival	Gap	China /Top 8	Gap	China /Rival	Gap	China /Top 8	Gap	China /Rival	Gap	China /Top 8	Gap
2 points	Attemped	18.0/21.0	-3.0	18.0/18.3	-0.3	6.8/13.6*	-6.8	6.8/9.7	-2.9	17.2/13.6	3.6	17.2/15.2	2.0
	%	41.5/50.8	-9.2	41.5/56.2*	-14.7	53.6/60.7	-7.1	53.6/53.9	-0.3	35.2/35.8	-0.6	35.2/47.1*	-11.9
3 Points	Attemped	4.6/9.2*	-4.6	4.6/10.7*	-6.1	1.4/0.8	0.6	1.4/0.5	0.9	7.8/14.2*	-6.4	7.8/11.6	-3.8
	%	26.9/32.9	-6.1	26.9/35.4	-8.5	10.0/13.3	-3.3	10.0/15.4	-5.4	41.4/44.4	3.0	41.4/34.7	6.7
FTP	Attemped	13.6/8.0	5.6	13.6/9.4	4.2	1.8/5.8*	-4.0	1.8/3.8*	-2.0	6.0/3.8	2.2	6.0/6.9	-0.9
	%	63.8/67.8	-3.9	63.8/70.3	-6.5	36.7/67.8*	-31.2	36.7/61.0	-24.4	42.5/69.0	26.5	42.5/78.2**	-35.7
OR		3.2/7.6*	-4.4	3.2/4.3	-1.1	1.2/4.4	-3.2	1.2/3.0	-1.8	0.2/2.4**	-2.2	0.2/1.8**	-1.6
DR		11.4/14.8	-3.4	11.4/13.3	-1.9	5.2/6.4	-1.2	5.2/5.4	-0.2	6.8/7.8	-1.0	6.8/6.8	0.0
AS		1.8/9.8*	-8.0	1.8/7.1**	-5.3	0.8/2.4	-1.6	0.8/1.0	-0.2	6.6/11.8	-5.2	6.6/10.8	-4.2
TO		4.6/2.6	2.0	4.6/4.6	0.0	2.0/1.6	0.4	2.0/1.9	0.1	6.0/4.6	1.4	6.0/5.9	0.1
ST		1.2/2.8	-1.6	1.2/2.8*	-1.6	0.6/1.0	-0.4	0.6/0.7	-0.1	1.6/2.4	-0.8	1.6/2.7	-1.1
BS		3.0/1.8	1.2	3.0/1.6	1.4	0.8/2.0	-1.2	0.8/1.1	-0.3	0.4/0.6	-0.2	0.4/0.4	0.0
PF		7.4/8.6	-1.2	7.4/8.9	-1.5	4.2/5.2	-1.0	4.2/4.9	-0.7	6.2/7.2	-1.0	6.2/7.7	-1.5
Score		27.8/35.2	-7.4	27.8/39.2	-11.4	8.0/20.6*	-12.6	8.0/13.3	-5.3	26.8/32.0	-5.2	26.8/31.7	-4.9
Total Score %		45.3/40.0	5.2	45.3/46.0	-0.8	12.1/24.0	-11.9	12.1/16.3	-4.1	42.6/35.9	6.7	42.6/37.7	4.9

4. Conclusion sand Suggestions

Adopting factor analysis, hierarchical clusting, regression analysis to louch a rearch on different position players in London Olympic Basketball Games. Result show that Comparing with rivals and top eight, Chinese forwards are feeble in paint offense, low in shooting percent, unbalanced in scoring, short consciousness of offensive rebound. Centers dificiency of comprehensive ability are obvious, lack of offensive means, weaking in scoring, insufficient in conditioning. Gurads ability is in progress, dare to take advantage of speed to break through but the problems that shooting was unstable and assists was low are still exist. Suggesting that Chinese team should strengthen entire combat ability, enhance players conditioning and improve physical confrontation of CBA, etc.

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